City of Keene
NEW HAMPSHIRE

Information Technology Master Plan

May 4, 2001

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Executive Overview

Background
This plan is an update to the original Information Technology Master Plan written in 1996, and provides guiding principles and a basic road map for the City's information technology vision, priorities, policies and procedures, as well as resources and expenditures in the coming three to five years. It will be updated as necessary to adjust to inevitable changes in the City's technology environment, and to ensure the City's effective use of information technology in providing quality government services.

Technology master plans create the bridge between business strategies and the information systems that support them. This plan identifies both the strategic approach taken in technology projects that ensures consistency with the City's business objectives, as well as tactical measures planned or under way to reach these strategic goals. Organization-wide support of this plan is important not only to benefit from revolutionary changes in the information technology and telecommunications industries, but also to maintain a quality level of service to City constituents.

Problem
Technology forces, both internal and external to the City, are changing the way business is conducted and consistently pressure the City's information management practices. Organizations who do not equip themselves to meet this changing demand will quickly find themselves with obsolete information systems that are costly to replace, and unable to do business with its partners and stakeholders in an efficient manner.

Approach
This strategic plan provides a unified vision for IT investment and strategy, as rapid developments in technology continue to change business practices. It provides a roadmap for the City to manage its information technology environment without requiring cutting edge technology, and without letting systems become obsolete. Following this plan, the City can continue to meet its business objectives, improve citizen services, and manage information technology expenditures in a strategic, coordinated manner.

Benefits
- Organization-wide coordination and support of information technology projects that improve government services
- Increased return on City-wide information technology investment
- Improved efficiency and quality of information service delivery
- Paced management of IT expenditures that enables the City to take advantage of technological efficiencies as they become available while preventing costly

obsolescence

- Improved access to City information by all citizens, staff, and business partners.

Vision
Through the coordinated efforts of all City departments, the City will implement and maintain quality information systems that effectively and efficiently deliver government services in an affordable manner.

In order to align information technology (IT) strategy and tactics with the broader business goals of the City, the input and participation of all City departments is vital. Through this coordination of efforts, the City's IT environment will be structured in such a way that no significant information needs are overlooked, and no information systems will become islands of technology that others are unable to utilize. Through the assignment of project teams (outlined later in this document) the selection and implementation of information systems will clearly address similar informational and functional needs across all City departments.

The implementation and maintenance of quality information systems requires an ongoing acknowledgement of trends in the IT and telecommunications industries. As advancements develop with the Internet and wireless networking, to name a few examples, so does the City's potential for improving service delivery. In the case of Internet telecommunications, the City can realize lower costs of communicating data to and from the State of New Hampshire in sending vital records information electronically rather than manually. This not only minimizes costs, but also delivers the service to the citizens with a significantly reduced cycle time. With recent improvements in wireless network design, some remote facilities can be connected to the City's network to access valuable resources at a significantly lower installation cost than other methods available before this option became viable. These are only a few examples that point out the benefits of the City's dedication to consistent research and implementation of the latest proven technologies in meeting its information systems goals. Doing so will reduce the likelihood of costly obsolescence, will minimize support costs now and into the future, and will improve municipal services.

Priorities

As the City's IT environment continues to develop, prioritization of initiatives is necessary to ensure the long-term competence of current and future systems.

Infrastructure, Centralization, and Standards

Maintaining infrastructure, centralization, and standards is required to ensure the feasibility of current and future IT projects and the achievement of common goals with comprehensive solutions. The three requirements are interdependent. The benefits of centralization are not possible without standards that lay the groundwork for common protocols and equipment for accessing central resources. Likewise, central resources are not accessible without reliable, standard infrastructure throughout the organization.

Through the coordination of all departments, the City will adhere to common standards in all IT projects and will prioritize the maintenance and implementation of adequate and reliable network and telecommunications infrastructure. In addition, all IT solutions will adhere to City hardware and software standards, and will be centralized when possible to improve accessibility to parties both internal and external to the organization.

Shared Resources

As detailed later in this document, teams that represent a good cross-section of City departments and users will be assigned to research and implement information system solutions. An underlying priority for all teams will be to identify common needs and seek comprehensive solutions that meet all of these needs. This will minimize the development of numerous independent solutions across departments when much of the information they rely upon can be shared between them. With this clearly prioritized, the City will meet IT demands with comprehensive solutions, lowering the total cost of ownership and improving the quality of data across the organization. This approach relies completely upon the prioritization of infrastructure, centralization, and standards.

Implementation Planning

It is not uncommon for independent IT needs to occur simultaneously. In some cases, the implementation of one project can benefit the success of another, but only upon completion. The City will 1) prioritize the projects that should come first, based upon the fact that this enables efficient implementation of others, and 2) not invest substantially in projects that could be completed more efficiently after completion of projects currently underway.

Case Example
A good example in support of this argument is Code Enforcement automation. Code Enforcement department staff identified that they had information needs that the VAX system could not accommodate. There was information pertinent to their operations that,

at that time, had no electronic means of storage and retrieval. Manual manipulation of this information was time and cost intensive. Code Enforcement stood to gain tremendously from an electronic solution that would automate this information process. The Information Management Services (IMS) Department worked closely with the Code Enforcement Department to research and analyze available solutions in the industry, and found that of all solutions analyzed, the least costly that met all of the City's code enforcement needs was a $75,000 software product.

Simultaneously, the Planning Department also had plans in place to implement a Geographic Information System (GIS) solution. Within 18 to 24 months of initiation, the GIS product would have logical, reliable access to much of the information required by the Code Enforcement department.

In this example, the IMS Department created a temporary workaround with existing resources for Code Enforcement to meet their basic needs in the short term. The City prioritized the GIS project and planned to meet the informational needs of the Code Enforcement Department within 18 to 24 months at a significantly lower investment.

In this manner, the City will prioritize all IT projects in a logical fashion so that the information systems needs of all departments are clearly understood, and so that information and resources can be utilized to their utmost potential.

Policies and Procedures

Effective policies and procedures are required for capable IT governance and decision-making. The following outline the policies and procedures used by the City and coordinated by the IMS Department in support of the City's IT environment.

Computer Policy Committee

The Computer Policy Committee is the nucleus of IT governance for the City. This standing committee ensures a commitment to City business goals in all IT projects, such as in this master plan, and implements and oversees IT policies. The membership of managerial staff is appointed by the City Manager and represents a good cross section of City departments. This allows for input from stakeholders of all areas of the City as it develops short and long-term IT plans and policies for the entire organization. The committee's activities are managed by the director of the IMS Department.

Goal
To ensure that the City's IT environment supports all information and system needs in a way that is manageable, is financially sound, and fulfills City IT and business objectives in a coordinated manner.

Benefits
The cross-departmental representation on this committee with oversight on IT projects achieves:

- Fair prioritization of IT projects in a manner that is consistent with the City's organizational priorities and financial capabilities
- Managerial consensus and sponsorship in the implementation of IT projects, policies, and procedures
- Focus in the direction of the City's strategic IT Master Plan.

Membership
To ensure appropriate representation and guidance, the membership of the Computer Policy Committee will include at least:

- The City Manager
- The IMS Director
- The Finance Director

- The City Clerk
- One department head representative from each of the City's three portfolios.

Information Systems Project Teams

As needs for automation and improvement in information management arise, the City will call together project teams with broad representation of user and management stakeholders. These teams will oversee the research, planning, selection, and implementation of new information system solutions, and have a temporary duration that is based upon project completion. Membership of these teams is appointed by the City Manager, and team activities are coordinated by the IMS Department.

These cooperative teams will strive to improve government services by clearly defining needs first, and then planning comprehensive solutions. The work of the committee may often start with the completion of a needs assessment focused upon the identification of opportunities that satisfy common functions and needs with single solutions.

Collaboration is the impetus of this team approach to solving information systems needs. It is the vital input and support of stakeholders that ensures the success of each project.

Goal
To implement sound information system solutions that maximize the City's return on IT investment, minimize support costs, and improve the quality and accessibility of City data and services via the coordinated participation of all City departments.

Benefits
These teams will achieve:

- Facilitation of the essential support and confidence of all departments in the research, selection, and implementation of City information systems
- Clear understanding and definition of information system needs prior to the planning of solutions
- Satisfaction of common IT objectives with a minimum number of solutions to best utilize City resources
- Achievement of noticeable improvements in the quality and accessibility of City data and services.

Hardware and Software Standards

City-wide hardware and software standards maximize effective use of existing IT resources and support strategies for long-term growth and sustenance. They leverage the City's investment in technology and ensure a long life span for newly acquired items.

When all City staff are using the same standard tools to access central information and resources, they can do so efficiently and with minimal costs of support and maintenance. For example, by utilizing the same email application rather than installing different applications in different departments, 1) all staff requires training on only one program, 2) the IMS Department supports only one program for all email purposes, 3) the City maintains only one support and maintenance contract with one provider, and 4) staff email communications are clear and simple with all users sending and receiving messages in the same format.

This argument holds true for all hardware and software standards. The standards simplify support and maintenance and improve accessibility to common resources. Because all City PC's are installed with the same applications, for example, all staff is able to utilize any one of these PC's to complete work assignments, access valuable information, conduct Internet research, etc., without having to be at one specific PC at one specific desk. Because of the Database Standard, critical information can be stored in a central location and integrated across multiple systems rather than maintained independently across multiple department systems.

These and other standards are imperative in conducting business in a manner that is reliable and compatible with other entities that interface with the City daily. Like many organizations worldwide, the City will adopt standards that are consistent with industry-wide accepted standards in order to foster communications with other organizations, such as the State of New Hampshire.

Goal

To maintain consistent hardware and software standards that facilitate information integration and accessibility across all City departments, as well as with citizens and external organizations.

Benefits

- City wide standards enable cross-system integration of current and future information systems
- Support costs are minimized
- Training costs are minimized

- Accessibility to valuable central resources is enhanced when all tools and applications used are standard and require only one format

- Communication between departments is simplified.

- The City maintains a similar pace with business partners in the use of standard tools and applications, which fosters compatibility in vital business communications.

Database Standard

In order to empower each individual database to provide meaningful information, the IMS Department has developed a database standard required of all database systems purchased and installed for City use. The Database Standard paves the way for all City computer systems to share a degree of interoperability, and guarantees no one system will become an island of technology independent from the rest of the organization. This standard will guide the long range planning of all City departments as new database systems are explored for integration with existing City systems.

All database systems must be:

- Relational Database Management System (RDBMS) Compliant
  RDBMS systems define a model where each piece of data is stored uniquely. Each element of data is stored once on the system but may be related to many other types of data. A person's name, for example, may be associated with a receivables record, an ambulance record, and a police record and yet the name is physically stored once on the system.

- Structured Query Language (SQL) Compliant
  SQL was originally developed by IBM to provide an English-like language to manipulate a database. Query Language is a misnomer because "query" suggests only retrieval of information when in fact SQL will allow adding and deleting of information as well. Today SQL has become an industry standard. Graphical tools which function in the MS-Windows environment may in fact perform their instructions via SQL on the database.

- Open Database Connectivity (ODBC) Compliant
  Microsoft invented the ODBC interface for Microsoft Windows. A Windows database such as Microsoft Access makes use of the ODBC drivers in order to communicate with other ODBC compliant databases. The ODBC drivers enable a standard set of SQL statements in any Windows application to be translated into commands recognized by a remote SQL compliant database. The purpose of the ODBC layer is to allow Windows to manipulate remote databases without requiring the user to be knowledgeable with SQL.

- Fourth Generation Language (4GL)
  In the database environment, 4GL tools refer to graphical functions in the MS-Windows environment which perform instructions on the database. This insulates the user from SQL while providing a graphical environment to produce database reports, data entry screens, and other applications.

- Open Systems Compliant
  IMS is moving away from the proprietary operating systems such as VAX/VMS and moving toward the modern industry operating systems which are non-

proprietary, namely UNIX and Windows NT/2000.

- Run a Graphical User Interface on Microsoft Windows.

Networking Standard

Electronic access to City data must be available to all departments in order to realize the true benefits of centralized resources. The installation and maintenance of standard networking equipment and protocols across all City departments enables communication and sharing of common resources, and lowers the total cost of the network infrastructure. The City's standard network infrastructure is designed to provide all City departments access to the IT resources that they require on a daily basis, and, importantly, prevents the development of multiple, duplicate solutions to meet departmental IT needs.

The City's network infrastructure will be installed and maintained according to these guidelines:

- Only single mode fiber optic cable, or methods that provide the same or better reliability, security and performance, will be used between city buildings to connect departments to the City's network.

- All network connectivity solutions installed will provide potential for bandwidth growth as improved electronics become available.

- Fiber optic cable terminates in each City building at Ethernet hubs, which split the data into communication signals, destined for each PC over separate category five copper wires.

- The City standardizes on Cabletron industry standard, intelligent hubs, which can be upgraded to higher speeds as needed and managed remotely.

- The City uses a standard patch panel approach throughout all facilities. This approach calls for connecting wire between source (central resource) and destination (PC's and printers) through the installation of a patch panel.

- Standard communication jacks will be installed and maintained in City offices. These jacks conform to the RJ-45 industry standard and provide connectivity over category five twisted pair copper wire, known as 10-Base-T, capable of 100 megabits per second.

- At each personal computer, network wire terminates on an Ethernet network interface card (NIC).

- The TCP/IP protocol is the industry standard and is a required feature of all network and computer equipment.

- Network security will be controlled by the IMS department to protect the sensitivity of all data transmitted via the City's network. Security administration will take place at all access points including the firewall, at each server, and at individual file and folder levels. Access to the City's network will be granted by

IMS only with signed acceptance by the end user and the signed approval of his or her respective department head on a completed City of Keene Network Use Policy (see Appendix A).

- Access to the City's electronic data and resources residing on the network by non-City users will only be granted for support and maintenance purposes, and must be approved by the IMS Director. Dialup is strongly discouraged as a method of accessing the City's network. Access via the firewall will be used whenever possible.

Computer Standard

To ensure universal access to resources from any location connected to the City's network, and to minimize support and maintenance costs, the City standardizes on one brand of personal computers and laptops. These computers are purchased with extended warranty, parts, and service agreements so that spare inventories can be kept to a minimum while uptime is maximized. This also ensures both financial and time savings when considering the collective life spans of all computers dispersed throughout City buildings. Upon expiration of warranty, parts, and service agreements, the computers will be replaced with new computers according to the City's Computer Equipment Replacement Plan.

- The City standardizes on Gateway desktop computers and portable laptops.
- All systems purchased will include a minimum three-year warranty and support for all system parts.
- All systems purchased will include the City standard operating system.
- All systems will be purchased with the minimum hardware and software requirements to perform City network functions for the entire term of the warranty.

Operating System Standard

To minimize support and training requirements, and to foster common access to City resources from all City computers, the City has standardized on the Microsoft Windows operating system. The Windows operating system is the highly recognized industry standard, and supports compatibility with a large majority of applications that may be installed to meet City needs. Compliance with the current standard version of the Microsoft operating system installed on City PC's is a requirement of all IT solutions purchased for installation on the City's network and computers. Standardizing on the Microsoft Windows operating system ensures compatibility with many programs utilized by and information formats generated by City business constituents and partners.

As of February, 2001, the standard Windows operating system installed on City desktop computers was Windows NT 4.0 Workstation. Microsoft has released its next version, Windows 2000, which is the next logical version to utilize on City computers. Consistent with past practice, Microsoft will stop offering the Windows NT operating system software, and the new version, 2000, will replace it. To avoid the existence of two different operating systems amongst City computers, the City will upgrade to this new version when it has been proven to be stable and reasonably supportable, and when all City applications are compatible with this version of the operating system.

For servers, the City has standardized on both Microsoft Windows and Solaris, depending upon the function of the server. Much like the PC's, Windows NT has been installed on some of the servers in the IMS computer room, however Microsoft will discontinue sales of this operating system and replace it with Windows 2000. The migration to this new version on City servers has already begun, and will continue as current applications are upgraded to support this version. Migration toward the 2000 version will maintain a uniform environment for all Windows servers, and will enable the City to take advantage of the latest resources available. For application specific servers, such as FIS for the finance application and GAMMA for the assessment application, Solaris is installed as the standard operating system. The Solaris "flavor" of the UNIX operating system is highly rated for system reliability and ease of maintenance, and standardizing on it for all UNIX servers will keep training and support costs to a minimum.

Desktop Processing Application Standard

For the same benefits as the Operating System Standard, the City standardizes on the Microsoft Office suite of desktop processing applications. This includes Word for word processing, Excel for spreadsheets, Access for data processing, PowerPoint for the development of presentations, Publisher for desktop publishing, and Outlook for email.

The IMS Department will install and maintain one version of the Microsoft Office desktop suite on all City computers, and will upgrade the version as necessary to maintain and enhance successful communication practices with vital business partners. As of February, 2001, the standard version of the Office suite installed on City computers was Microsoft Office 2000.

Telephone Standard

The City standardizes on one telephone system. This system is to be installed throughout all City departments as it becomes economically feasible. Supporting one complete system enhances communication between City departments, and enables cost savings and improved services via the sharing of phone lines. With one system in place, the City will be able to combine external phone lines into one common pool. This will requires fewer total external phone lines and allow access to more lines per department to minimize the likelihood of citizens getting busy signals when calling City departments. In addition, centralizing and standardizing on one system will make a uniform resource available to everyone, rather than requiring deployment of multiple systems in different buildings and experiencing the overhead (installations, training, support, upgrades, training, contract management, etc.) required to support them.

The standard telephone system will be upgraded as necessary to meet the telephony needs of City staff and the public, and as advancements in communication technologies make efficiencies and improved services available. When all departments are utilizing the same phone system, the City will migrate to a voice-over-IP system to send voice communications over City-owned fiber to improve the quality of the phone system and reduce the ongoing cost of telephone services.

- The City currently standardizes on the Ideacom (formerly Executone) phone system.

- The City centralizes all system monitoring and control of the phone system in City Hall and the IMS Department so that changes and troubleshooting to the system can be conducted from one location.

- The City will maintain an ongoing support and maintenance agreement with the Ideacom provider to ensure consistent and effective functionality of the system with minimum down time.

Purchasing Procedure

The City requires that all IT and telecommunications hardware, software, and professional services be authorized by the IMS Department. This will give the IMS Department an opportunity to 1) identify common needs between departments, 2) ensure adherence to City standards, and 3) use known resources to get the best available prices for all products. Adherence to this procedure is crucial to all of the driving forces of this plan, and deviation from it would prove costly.

Goal

To ensure that all IT and telecommunications hardware, software and services comply with City standards, policies and procedures in order to secure maximum return on IT investments.

Procedure

- All purchase orders for the purchase of IT and telecommunications hardware, software, and services must be approved by an authorized IMS representative

- The IMS Department will analyze proposed purchases to ensure they meet all City standards including the database, networking, computer, and operating system standards

- The Finance Department will not process IT or telecommunications hardware, software or service purchase orders that do not have the authorization of the IMS Department.

All departments are encouraged to seek the advice of the IMS Department before researching potential hardware, software and service solutions. IMS will do everything possible to assist each department in finding solutions that meet their specific needs and comply with City standards and business objectives.

Benefits

- Ensures conformity with the City's IT Master Plan in support of current and future IT objectives

- Ensures compliance across all IT and telecommunications purchases with City established standards that support interoperability, minimal support costs, data quality, and optimal performance

- Centralizes awareness of all IT projects so that the IMS Department and Computer Policy Committee are able to identify areas where resources may potentially be shared rather than allowing costly redundant systems to be utilized independently in different departments.

Computer Equipment Purchasing Procedure

The purchasing procedure used in the purchase and replacement of City computer equipment (PC's, laptops, and printers) is referred to as the Replacement Plan. This plan provides funding annually to replace computer equipment according to a strategic schedule that makes both financing and managing the replacements reasonably feasible. By replacing equipment according to this schedule, City staff are given equipment that meets their current and future performance requirements. Their work will not be limited by tools that are out of date.

Goal
To keep quality, reliable computer equipment that meets end user needs in all City departments at the lowest total cost, while minimizing the capital expenditure impact.

Procedure

- All PC's and laptops will be purchased with a minimum three-year warranty on all parts. This will minimize the cost of maintaining spare parts inventories.

- Upon purchasing a new PC, laptop, or printer, each department will pay the current year's established purchase price into the Replacement Fund. (Yearly purchase prices are determined by the IMS Department according to the minimum hardware and applications necessary for each PC, laptop, and printer to function in the City's IT environment.)

- The IMS Department will purchase new PC's and printers using funds accumulated in the Replacement Fund.

- Each year, based on a complete inventory of computers and printers, each department's budget will include funds for 1/3 the replacement cost of their computers and printers (based on a 3-year replacement plan). The replacement costs are calculated using the purchase price less any expected income from the sale of warranty-expired equipment.

- Upon expiration of the warranty period, each PC and printer will be replaced and sold via standard City practice, and revenue from these sales will be credited to the Computer Equipment Replacement Fund.

It is important to note that when the application serving solution (further described later in this document) has been implemented, the life of PC's will extend from three to possibly five years. In addition, the PC auctions may not yield the highest possible return at the end of the life of these PC's. The City will begin returning or exchanging old PC's with Gateway when this method becomes less costly or more profitable than auctioning.

Benefits

- Ensures the existence of functional equipment that meets user needs over time
- Eliminates drastic fluctuations in budgets by funding on a yearly basis
- Minimizes the risk of costly computer equipment obsolescence
- Minimizes the total cost of ownership for each computer, laptop, and printer.

Network Use Policy

Much of the Data maintained by the City is not only pertinent to providing valuable services, but is often private information that is not to be made available to the public. In addition, the City has a very valuable asset in both the data and in the network hardware and software that are used on a daily basis to provide services to the public. Hence, thorough network security is a top priority of the IMS Department.

The City has a Network Use Policy (see Appendix A) that binds network users to a legal agreement concerning appropriate use of the City's network. It clearly defines the terms under which access to the network is granted. These terms ensure appropriate use of the network, including email and the Internet, and computer hardware and software. All City employees and their respective department head must sign this policy in order to get network access accounts established. Individuals and businesses external to the City's organization who require access to the City's network for support and maintenance purposes will only be granted temporary access upon the authorization of the IMS Department. Under no circumstances will any exceptions be made to this policy.

Goal
To enforce the Network Use Policy in order to secure the reliability and privacy of City systems and information.

Benefits

- Protects vital network security
- Encourages appropriate use of valuable City resources
- Gives the City a legal course of action to pursue in the case of inappropriate use that may jeopardize the security or reliability of City systems or data.

In-House Systems Development Policy

The structure of the IMS Department is geared toward effective IT planning, management, and support for the entire City of Keene organization. In February, 2001, there were approximately 300 network users and 225 PC's and laptops dispersed throughout 15 locations. In addition, the number and scope of information systems implemented in the City's IT environment since 1996 has grown substantially (see Appendix C). This trend will continue as developments in IT and telecommunications dramatically change standard business practices, to which the City must respond and adjust.

It is important that the City clearly define the role of the IMS Department to ensure effective management of its IT resources. Application development is a large task that would be an unrealistic expectation of the IMS Department at current staffing levels, and would come with significant overhead. The most cost effective approach to application development now and into the future continues to be purchasing applications and development services from organizations that specialize in development and have the specialized resources to do it effectively. This precludes, therefore, no in-house application development by the IMS Department for programs intended for long-term use. The costs associated with the purchase of applications and development services from third party organizations is far less than the investment that would be required to empower the IMS Department with the tools and human resources it would need to perform in-house development of custom software applications or modules.

The best approach to minimizing the budget impact over the long-term is to purchase applications that best meet the needs of City departments, and maintain support and maintenance agreements for the life of these applications. Ongoing support and maintenance agreements with application vendors and third party support organizations will be maintained for all applications to ensure effective problem resolution and timely upgrades.

Goal

To minimize long-term IT costs by discouraging in-house application development and by maintaining ongoing support and maintenance agreements for all City applications.

Benefits

- Long-term cost savings will be realized for development, support, and maintenance of City applications

- All applications will receive regular updates and releases that accommodate current trends in the IT and telecommunications industries

- The City can benefit from the specialized talents of application developers who are employed by the application vendors, and, thus, avoid significant in-house

staff training and compensation costs

- In the dynamic and complex world of modern information systems, the City will continue to benefit from specialized programming services with support and maintenance agreements intact.

Resources and Expenditures

In the coming three to five years, a number of City departments will make expenditures for the implementation of new or improved IT resources. These resources are important to the ongoing operations of each department. Investment in these resources is justified by noticeable improvements in government services, and it enables the City to take advantage of consistent IT developments that force changes in commonly accepted business practices.

Rapid developments in the IT and telecommunications industries are feeding the public demand for the use of modern technology in the purchase and receipt of common services. The International City/County Management Association, ICMA, states,

> "Although the world of local governments is not nearly as cutthroat as the world of business, neither is it entirely uncompetitive or risk free. If the local government is not competitive in terms of its service delivery, its working infrastructure, and its ability to deliver a high quality of life, citizens will not remain passive. The most capable and productive citizens will essentially cast a vote of no confidence—either at the ballot box or by voting with their feet. To remain competitive producers of the unique public goods and services that they have to offer, local governments must attend to the trends that are affecting businesses. In addition, if a community's vitality is the sum of the vitality of its private and its public sectors, local governments need to learn not only how to imitate the best of the digital businesses, but also how to lead. Local government leadership should identify and exploit opportunities to create a new digital infrastructure for the public sector and new applications that will enhance economic development, as well as facilitate democratic decision making." (*Local Government On-Line*, ICMA, 2000)

The City has a responsibility to acknowledge IT trends and use widely accepted methods of service delivery. By managing its existing IT resources and strategically planning future IT investments, the City will be in a good position to keep pace with and take advantage of technology developments that reduce transaction costs and improve public services. This is the focus of the organization in resource and expenditure planning outlined in this plan.

Mission Critical Systems

In conjunction with the Computer Policy Committee, the IMS Department will regularly review the City's IT systems and classify those that are mission critical. These systems will be included in the City's disaster recovery and contingency plans to ensure maximum reliability and availability of the tools that are deemed crucial to delivering City services.

IT systems classified as mission critical meet one of two overall conditions. They are either systems whose omission would significantly inhibit 1) the City's ability to provide services for the public good in a timely, effective manner, or 2) operations internal to the organization which are critical to its existence. If IT systems meet one of these two conditions, they are then ranked by their impact on public health, public safety, critical internal operations, and customer service.

As of February, 2001, the City's mission critical systems include:

- Telephone system
- Network infrastructure
- Environmental control systems in the IMS computer room
- Internet service
- Server and data storage equipment in the IMS computer room
- All City PC's
- IMC application
- State of New Hampshire's SPOTS application
- HazMat hazardous materials application
- CityView application
- SCADA application
- FIS finance application
- IAS assessment application
- Keene-Link
- Transfer station scale software application.

(The GIS system, and possibly others, are likely to be added to this list upon implementation.)

It is important to note that 1) this is only a small subset of the complete inventory of City IT systems in place, and 2) this list is growing consistently as trends in the IT and telecommunications industries produce reliable information systems that omit the dependence upon backup manual and paper systems. There are many other systems installed in the City's IT environment that deserve consistent support and maintenance. All systems, mission critical or not, will be maintained on a regular basis and receive the attention of the IMS Department as needed. Mission critical systems will be tended to at the highest level of priority.

Connectivity and Communications

The network infrastructure between and within City buildings makes critical resources available to all departments. The existing fiber optic network is a valuable resource that, in this way, will continue to be used to its full potential. With over 200 PC's on the City's network, the City spends less on total support costs in the long-term by centralizing resources. Centralization is possible only with this network in place, and enables acceptable levels of security and reliability.

The fiber network, securely administered behind the City's firewall, fosters communication and simplifies operational requirements. For example, multiple departments at dispersed locations have access to the same finance system so that all are entering purchase requisitions, payroll hours, budget figures, etc. directly rather than maintaining separate tracking systems, manually filling out paper forms, and mailing them to the Finance Department for re-entry in the main financial system. Another example is the fiber connection between the City's Public Library and Keene State College that allows the two entities to share one library management system, and at only one-third the total cost to the City. This sharing of resources not only keeps costs down, but also provides a fully integrated library service to the public. It is also through the use of City fiber that the Keene Police Department, Keene Fire Department, and Southwest New Hampshire Mutual Aid organizations share common resources that directly improve the level of emergency services to the public.

Because the investment made to install the fiber optic backbone throughout the City as well as its importance in providing City services, the IMS Department will consistently monitor the network equipment and continue to support, maintain, and upgrade it as necessary to meet minimum application requirements and avoid costly obsolescence. In addition, as it becomes necessary, remote City sites will be connected to the network with either fiber or wireless methods that meet minimum security and reliability requirements both now and into the future. All equipment will meet minimum scalability requirements that allow simple upgrades as new technology becomes available, such as voice-over-IP, for example.

At all times, all private network resources and traffic will be maintained behind the City's firewall. The City's fiber optic infrastructure connecting multiple City, school, and other facilities is a tremendous resource that should be utilized to its full potential, and will be as opportunities arise. See Appendix B for a full network diagram.

Application Architecture

Whenever possible, client server applications are installed and maintained on the City's network. This centralizes the applications so that users can access them from anywhere on the network and ensures that licensing is used to its maximum potential.

System security is also enhanced when applications are centralized. In the case of the City's financial application, for example, the IMS department can setup access restrictions that allow only authorized users access to critical financial data, whether or not they have the client program loaded on their PC. If the program were installed independently on each PC it could be available to anyone who had physical access to each PC.

When considering new software programs, priority consideration will be given to those programs that will support this centralized environment. It is important to note that with the Application Serving project, the IMS Department will be migrating from a client server to an application serving environment, which continues to centralize programs, yet requires no additional client access software on each networked PC.

Training

With the considerable investment the City makes in its IT resources, support for consistent training is vital in order to utilize these resources to their maximum potential and attain the service level performance improvements that are made possible because of them. In addition, technical training will empower City staff to support, maintain and use IT resources while minimizing additional costs required to support them.

Financial support for organization-wide technical training is essential, but is only the beginning. A successful training plan requires investment in professional training programs. It also calls for an effective medium for the sharing of technical knowledge and resources, the coordination of user forums to share technology experiences, developments, and discoveries, and direct project management practices that fully employ the knowledge of trained staff. It is only with each of these components in place that the City will redeem all possible benefits from its investment in technical training.

The IMS Department will include the costs of technical training programs (for both IMS and non-IMS staff) in its yearly operating budget. IMS staff will also coordinate the implementation and maintenance of an electronic knowledge base via the City's Intranet, hold regular user group meetings for common applications (such as Microsoft Office and the Internet), and align technical training with the broader business goals of the organization. The goals of this approach include both building the knowledge necessary to carry specific information systems projects through to completion, and to aid in the retention of skilled employees.

Technical Support: Personnel and Resources

In the last ten years, the size, number, and complexity of information systems and applications installed and supported by the IMS Department has increased dramatically, as it has for municipalities across the State of New Hampshire. Municipalities are experiencing the same IT pressures of all organizations that wish to do business efficiently and reliably. Although the growth in business dependence upon IT systems has increased IT expenditures, it has also continued to significantly improve service delivery and reduce transaction costs. To be left behind in this technological revolution would be far more costly than to keep pace with IT improvements that create improved public service opportunities. In the field of technical support, the most affordable approach to keeping pace in this environment is with a sensible balance of investment in 1) outsourcing, 2) technical development and application of existing human resources across all City departments, and 3) growth in IMS staff.

The IMS staff is constantly striving to maintain high quality service levels while simultaneously experiencing increased workloads. In addition to outsourcing, the IMS Department is also turning to other City staff to participate in the maintenance of the City's IT environment through the Technical Liaison program. These two initiatives will be used as much as possible to meet the increasing demand for IT services within the City. However, there is a precise balance of outsourcing, widened staff support, and IMS staffing that is crucial to the affordability of the total support package. As the outsourcing of technical and professional IT services approaches 25% of the IMS operating budget, industry research indicates that adding staff to support internal operations would prove less costly than further increasing outsourcing expenditures. Therefore, as the City's technology environment grows in response to industry trends, the organization stands to gain the most return on investment by utilizing a good balance of outsourcing, increasing interdepartmental staff support, and growing the IMS staff.

Outsourcing Technical and Professional IT Services

The size of the global IT environment and its growing influence on business practices across the world has multiplied many fold the number and complexity of programs, languages, files, formats, platforms, etc., that organizations depend upon to conduct everyday business. In direct response to this trend, the field of IT consulting has grown exponentially since the late 1990's. No small organization can reasonably or affordably keep up with these technology developments without a substantial internal IT staff. Therefore, in order to continue doing business with the vital IT tools that shape standard business practices, outsourcing a portion of the technical and professional IT services required is crucial to meeting City business and IT objectives in an affordable manner.

By outsourcing a portion of the services required to support and maintain its IT environment, the City benefits from the highly specialized and competent skills of certified IT professionals. The costs that would be required to maintain this level of skill and knowledge for the support of all City information systems in-house would be far

more than that required to contract the specialized talents of IT consultants for selected City systems. To minimize the total costs required to keep pace with trends in standard IT business practices, the IMS Department will experience an increase in the outsourcing of technical and professional consulting costs in coming years, not to exceed the 25%-of-budget optimum. The only alternative is to spend significant amounts of time and money on in-house development, training, and recruiting that far surpasses the costs of maintaining a reasonable balance between both increased reliance upon outsourcing and internal support staffing.

Technical Liaison Program

In February, 2001, the IMS Department conducted a technical training and certification program that included a wide array of participants from most City departments. These participants, the Technical Liaisons, now handle basic technical support and troubleshooting tasks for each City department. Tasks will range from calling Gateway to order replacement parts for failed monitors, keyboards, etc., assisting with common questions and problems with the Microsoft Office applications, to carrying out simple procedures on PC's so that IMS staff does not have to physically travel to each PC.

What are the critical success factors that will measure the effectiveness of this program? If the following are accomplished over time, the program will continue to succeed:

- Faster response times to staff with basic hardware and software issues, and, therefore, better service to the public

- Use of existing staff resources to meet the deficit between the City's technical support needs and that which is reasonably available from the IMS Department

- Time devoted to technical support does not significantly detract the liaisons from the work required of their respective departments.

The IMS Department will provide regular training to the Technical Liaison group and certify new liaisons as necessary. This is one way in which the IMS Department stretches its training dollars by sharing knowledge with other City staff members to continually improve the support environment.

Growth In IMS Staff

With some investment in outsourcing and the implementation of the Technical Liaison program, the IMS Department hopes to minimize the need for increased staff resources. However, the growing IT environment does demand a certain level of internal support. If information systems are to be utilized to their potential, the IMS Department must have the resources required to train, support, troubleshoot, and maintain them. As existing systems grow in usage and new systems are implemented throughout the City, some comparable growth in the IMS staff is required. When reasonable outsourcing and technical development of existing staff reach the optimum IT service potential and there

is concurrently a deficit in the IT service required to support City systems, the IMS Department will request additional staff.

The characteristics of current and upcoming priority IT projects will define the technical needs of future IMS staff. For example, the Data and Internet Integration and GIS projects, among others, will integrate City data and make it available to the public via the Internet. As detailed later in this plan, the benefits of these projects are tremendous in terms of how they improve City information practices and information accessibility to both City staff and citizens. To manage this project and the resulting data environment successfully, the IMS Department will investigate the need to hire a Web Master who will be responsible for the interface that groups City data and ports it to the Internet, while maintaining a simple, current, user friendly interface on the City's web site and private intranet site.

As new information systems are implemented across City departments, the support, training needs, and number of end users multiply, as has been the case consistently over the last decade (see Appendix C). The national average number of helpdesk technicians per number of organizational IT users is approximately one per one hundred. As of March, 2001, the IMS Department had one helpdesk technician and approximately three hundred users. Although the temporary, part-time staff, typically college computer science interns, are very helpful in responding to some of the basic helpdesk requests, there is still a significant shortage of professional helpdesk resources. As this continues, the use of the City's vital information systems is jeopardized. The IMS Department will evaluate the helpdesk function and its ability to be responsive to City needs. It is most likely that additional helpdesk staff may be required.

Additionally, as IMS staff grows, so do the department's administrative duties. The record keeping, reception, and office management tasks will require the addition of a department secretary so that IMS technical staff can be completely devoted to managing the City's IT environment.

Current and Future Information Technology Implementation Projects

Through regular Computer Policy Committee meetings, IMS staff meetings, and IT project review during CIP and operating budget planning, the City identifies priority IT projects that will improve business practices, and, therefore, improve quality delivery of City services. Support, both conceptually and financially, of IT projects that support mission critical functions is essential.

The IMS Department has implemented a logical project planning procedure that will be followed from start to finish with all priority IT projects. Each project plan will include:

- A general project description
- A mission statement
- Identification of stakeholders, both internal and external
- Specific stakeholder objectives
- Identification of key staff participants including the project manager, other IMS staff, and staff of stakeholding departments
- A detailed breakdown of how the project will be funded
- A listing of action items and milestones with a timeline that presents target dates for each item
- Identification of the measures of success, or measurable results that will indicate successful progression in each project
- A statement of compliance with this IT Master Plan that clearly indicates how each project is serving the vision of the plan
- Approval of the project manager, IMS Director, and the department head(s) of the department(s) that will directly benefit and participate in this project.

This planning procedure will be utilized for all CIP IT projects, all IT projects that significantly impact the entire user base, all additions and replacements of system servers, and other projects that meet minimal impact and critical need thresholds. These project plans will be accessible on the IMS Department web site.

Specific IT Projects

This section of the document focuses upon priority IT projects currently underway or planned for future implementation, and includes brief overviews of each. Some of these projects are CIP-funded, and others are included in department operating budgets. Because IT opportunities cannot be foreseen five years in advance, this section will be updated as necessary to include new IT priority projects as they arise. A complete matrix depicting these projects with detailed information is included in Appendix D.

Data and Internet Integration

The Data and Internet Integration project will bring together many subsets of City data and make them work cohesively. By linking these data sets together in a logical format that combines relevant data from multiple locations, the City will eliminate redundant data entry among departments. Furthermore, citizens will have a complete, uniform method of accessibility to information both in City Hall and on the City's web site. Importantly, all departments will be able to continue using the specific software tools they have invested in while still taking advantage of this new method of data storage and retrieval.

Of key importance in this project is the requirement that implementation be planned cooperatively with the GIS and Public Works Information Management Systems projects. Both GIS and the Public Works system will bring together data for specific purposes, however, will also generate informational resources that will be utilized in the Data Integration system. Rather than redo the work completed in the specific projects, Data Integration will take into consideration and utilize the information resources generated in both.

Linking Relevant Data

Because each department has specific informational needs, no one software solution is available today that will meet all municipal information system requirements. There are many systems available, however, that have quite clearly addressed the individual needs of independent department functions. Municipalities must either install these multiple, independent solutions, or develop custom software solutions. Because the custom development option is most often not within reach financially, the common approach for municipalities, such as the City of Keene, has been to install independent solutions so that each department has the specific resources they need to provide services in an efficient, quality manner.

Over the years, the City has generated a disperse inventory of software applications and databases, many of which contain identical or related data. This project will create the links between the data which will empower managerial decision making, eliminate redundant data entry, improve the reliability of the data, and most of all, improve the

level of service to citizens. All data functions performed in City Hall on a daily basis will improve when data can be shared. Citizens will be able to do "one stop shopping" both in person and on the City's web site when all of their information is available from one source. This is a long standing goal of the City's that was first documented in the original IT Master Plan written in 1996, and prompted the Database Standard which applies to all existing City information systems and enables data integration between them.

Web Site Accessibility

The second phase of the Data Integration project will include the delivery of data via a single interface to Keene citizens via the City's web site. Although data may be coming from multiple sources, to the citizen it will appear on one informational web page as one set of data pertinent to the individual. With this in place, Keene citizens will be able to view all outstanding bills, such as tax bills, utility bills, parking tickets, dog licensing fees, etc., on one page, and will be able to pay them simultaneously. This type of service is in high demand and is being implemented in numerous towns and cities in New Hampshire, and elsewhere. With the City's data logically integrated, Keene will be in a good position to serve the public via its web site.

GIS

The Geographic Information System (GIS) project involves creating a complete GIS system that will identify geographic relationships between data sets from multiple, independent databases. Because of the volume of data that will be integrated for this specific purpose, this project will tie in with the Data Integration project so that both projects can benefit substantially from one another.

GIS is a proven tool used by government, business, and industry to manage geographic information and mapping more effectively. Approximately 85 percent of the City of Keene's information used every day by City staff, boards, and commissions is geographically related. GIS greatly improves access to and use of this data by improving efficiency of redundant tasks and allowing for complex analyses that would not otherwise be possible. The most important aspect of GIS is that it supports better decision making at all levels of government by providing better access to information.

This project begins with a complete Needs Assessment and Implementation Plan that establish a clear foundation for the development of an enterprise GIS for the City and sets forth a three-phase plan for deployment:

Phase One consists of several components: purchase and deployment of ARC IMS GIS software to be served over the City's intranet; Purchase of GIS server and data storage equipment to store GIS data and publish intranet pages for user departments; and training for user departments and the GIS technician. Other components of phase one include data development and conversion.

Phases two and three of the GIS Implementation Plan extend deployment of the systems to the public over the Internet and continue data collection and development. All aspects of GIS development will be coordinated by the GIS Technician in conjunction with the IMS and user departments, and all training will be completed in-house.

DPW Information Management System

The Public Works Department receives and responds to hundreds of requests for various services annually and is responsible for the management of over $100 million worth of infrastructure assets. There are seven different divisions within the department spending over $14 million annually. Each division is responsible for maintaining it's own separate information on the specific functions it oversees. Currently, the department keeps track of its activities in separate databases and on paper forms. This method of tracking is not efficient, and requests for specific information are timely to produce.

In July, 2002, the City is required to be in compliance with the Government Accounting Standards Board (GASB) Statement 34 that requires the City to report its financial status in a format similar to private industry. One component of the financial reporting is the identification and tracking of the financial status of the physical assets of the City. These assets include roads, bridges, water and sewer mains, pump stations, and other infrastructure elements. GASB 34 requires that the financial condition of these assets be identified and continuously tracked.

This new DPW Information Management System will allow for the integration of the various databases leading to more effective planning, coordination of work, job costing, and analysis. It will provide for the monitoring, tracking and reporting of departmental activities such as: pavement management, traffic safety, job costing, inventory control, etc. It will also support integration with other applications such as the Financial Information System (FIS), Geographical Information System (GIS), and Data Integration solution to assist in managing and analyzing related data. The software will provide managers with easily accessible information on what needs to be done, projected costs to accomplish specific tasks, and will assist in determining all cost-effective alternatives.

Application Serving

Years ago, limitations of performance and cost caused a shift in the computing world from mainframe to client/server environments to give people better technology at their desktops to do their work efficiently. Those limitations have been eliminated with remarkable technological advancements that make the City's environment a perfect candidate for combining the advantages of both mainframe and client/server environments to improve the quality of the tools available to City staff and constituents at an affordable cost.

Application serving is an environment that combines the positives of mainframe and client/server environments, and eliminates the disadvantages of each. The client/server environment requires significant expenditures for support, maintenance, and training at each individual desktop. The more locations added to this computing environment, the more costly to support. Application serving is a server-based environment in which much of the processing that would occur at each desktop level in a client/server environment all takes place on one server in one location. This is possible with inexpensive, "thin" clients at the desktop level and minimum bandwidth connections. Implementation of application serving in the City's computing environment will make more technology available to more people at a lower total cost of ownership.

The City currently spends $2300 per PC every three years to keep capable computing hardware at the hands of users. This plan, the PC Replacement Plan, has proven instrumental in both keeping useful, efficient computing resources in place while also minimizing the capital impact over time. The City plans to decrease both the total cost per desktop as well as the life of PC's per desktop, lowering the total cost of ownership, by implementing an application serving environment that will minimize performance requirement at the desktop level. In addition, upon successful implementation within the City environment, the City may have an opportunity to provide application services to other municipalities.

IMS research has uncovered a number of case examples here in Keene and across New Hampshire where this type of environment has succeeded. Implementation of this project will begin when all City software applications have been proven compliant with the application serving environment. The IMS Department will work with a professional services group to complete a proof of concept test before any implementation expenditures are incurred.

Library Keene-Link Software Conversion

Keene's public library has partnered with Keene State College in sharing the functionality and cost of its library automation software, Keene-Link, since 1992. This system is mission critical for the Public Library which uses it to perform all of its daily operations. The developer is currently upgrading Keene-Link to a web-based package that offers increased functionality as well as improved customer service features, which will soon render the existing software obsolete.

In conjunction with other University of New Hampshire campuses, Keene State College is purchasing the new, upgraded software, titled Millenium. Hence, the City will upgrade to the Millenium product as well in order to continue participating with the college. Under this partnership, the City annually assumes only one-third the cost of the software and performs joint staff training with College staff. This collaboration has proven to be extremely beneficial both in cost sharing potential as well as in service to the public.

The product vendor will continue support of the existing product for the short-term, however software updates will only be available for the web-based Millennium product. The IMS Department will work closely with the Public Library and Keene State College to migrate to Millenium. An important goal with this project will be to utilize the existing fiber network between the Public Library and college campus for the transmission of data between the two systems. This is the current setup with Keene-Link, and provides much higher levels of security and reliability than the Internet, and puts to use the fiber network as it was intended.

Network Connectivity

There are a number of projects currently under way that involve the connection of remote facilities to the City's fiber optic network. These connectivity projects will be undertaken as remote site operations warrant the cost of implementation.

The West Keene Fire networking project is underway to provide this location with network resources that enhance their operations, such as access to the Fire Department's IMC software, email, file and print services, etc. In addition, with the installation of network connectivity, future phone system installations will be possible within this architecture to further integrate telephone communications between City departments. Other sites for which network connectivity is being implemented or explored include the Transfer Station and two Keene Housing Authority locations at which a Keene Police Officer will be stationed.

The City's fiber network has been installed throughout much of the Keene area and provides some potential now for the installation of wireless technologies to meet these networking goals at remote sites. Although fiber is the preferred method for network connectivity, wireless options can be significantly more cost effective for distant locations, and will be considered and tested to ensure minimum reliability, throughput, and security requirements. Many municipal government organizations throughout New England, with its disperse geographic layouts, have implemented wireless networks that have given them the ability to better serve the public with minimum capital expenditures.

Regardless of the methods used, the network equipment will be scalable, and will take into consideration future potential usage, such as voice-over-IP, for example. In addition, the City will partner, both in cost and implementation, with the school system's Supervisory Administration Unit to provide access to Keene schools when possible.

Phone System Upgrade

Ideacom, formerly Executone, has provided the City's standard phone system since 1996. As of February, 2001, all systems except those in the Police and Fire Departments have been upgraded to this system and share voicemail and connectivity equipment.

Both the Police and Fire Departments have maximized the usage of their existing Panasonic phone system, and must make a significant expenditure to upgrade this system to meet their needs. Consistent with the City's Phone Standard, rather than make a significant expenditure to upgrade a non-standard system, both Police and Fire phone systems will be replaced with Ideacom systems. Communication between the departments as well as with other City departments will be improved, and some of the work required of the phone system will be accommodated by the City's fiber network.

Upon installation, these new systems will patch directly into the City's centralized voicemail system, which runs over City fiber directly into the basement of City Hall. With these two implementations complete, the City will then have the ability to share external phone lines which will allow a smaller total number of lines (and, therefore, lower cost) and will also decrease the likelihood of the public getting busy signals upon calling City departments.

An important factor considered in the decision to implement new phone systems for these departments was that both departments may move to other facilities within the next few years. It was determined that the new Ideacom systems were portable, and could be removed and reinstalled in the new facilities, and upgraded if necessary.

Tax Billing

For property tax bill generation, the City currently uses the VAX system that has been in place for well over a decade. This system was implemented on the VAX due to the fact that the City's assessment system also resided there. Because the new assessment package now resides on an independent server and will no longer maintain property records on the VAX, the City must implement a tax billing system that will take full advantage of the new assessment system.

The existing finance application, FIS, is equipped with a property tax module that will be used for this purpose. IMS, Finance, and Assessing will work with Pentamation, the FIS developer, to customize the tax module for City of Keene and State of New Hampshire requirements. Customization will also include the development of an "Assessment Load" procedure to transfer property information such as value, ownership, exemptions, and credits directly into the FIS program for tax bill calculation.

The Assessing, Finance, and Revenue Collection staff have been long awaiting this new system. It will significantly streamline the generation of tax bills and collection of tax revenue, and improve the tax collection process for City property owners.

Network Data Storage

With the shift from mainframe to the client server architecture in the mid 1990's, the City began purchasing servers with hard drives located directly within them. Because the servers are on the network, their drives are accessible by authorized network users. The only problem with this setup is that the performance life of these servers has outlived the capacity of their drive space.

The possible resolutions to this scenario include replacing the hard drives within the servers, or installing network storage solutions that are independent of the servers. The network storage solution is the most attractive due to the fact that it will survive as a long-term data storage solution regardless of the life of any of the City's servers. In addition, network storage allows more inherent scalability (drive space can be increased simply by adding an additional storage device rather than replacing the entire unit), as well as improved accessibility by all network users regardless of which servers they require access to. Hence, a network storage solution for both the NT and Solaris platforms will be implemented.

This project is very important to the ongoing performance of numerous systems which the City has invested heavily in in previous years. More and more information is stored electronically, and this includes everything from text to photos and drawings. Not only is the number of electronic systems increasing, but the extent of data recorded in existing systems is on the rise as well. Successful completion of this project will equip the City with a data storage mechanism that will serve both existing and future applications.

Network Equipment Upgrades

The City standardizes on Enterasys (formerly Cabletron) network hubs that connect equipment such as PC's and printers within City facilities to the fiber optic network. Many of the existing hubs, installed in 1995, were intelligent 10Mb hubs. These hubs are still in place, but will soon limit the required throughput of City applications. The networking hardware, both external (fiber) and internal (cabling between offices) is 100Mb compliant, but because it all terminates to 10Mb hubs, the fastest throughput available at any point where a 10Mb hub is installed is only 10Mb. This also holds true for some of the switching equipment located in City Hall.

To equip the network for 100Mb potential throughput will be somewhat simple due to the fact that this has been the plan since initial installation in 1995. Only a small portion of the network equipment requires upgrading, and can be implemented by Enterasys, who is familiar with the City's network and existing equipment.

Although the current 10Mb throughput has not yet inhibited network transmissions, the IMS Department expects this to be the case before 2003, and will plan an upgrade from all 10Mb equipment to 100Mb equipment.

Appendix A: Network Use Policy

Access to the City of Keene computer network, which includes network resources, e-mail and the Internet, is provided to authorized City employees to promote communication with people and access to resources both inside and outside the City's network. Network access is provided for official City business purposes and will be authorized individually for each City employee by their respective department head. All users must adhere to the same code of professional ethics that governs all other aspects of City communication. Employees must read the following paragraphs and provide their signature to state acceptance of the terms herein for acceptable use of the network.

Although City network activity, including e-mail and Internet use, is not routinely monitored, the employee must be aware that all work performed on the City's network remains the property of the City of Keene and may therefore be monitored and/or surrendered to a court of law. The employee must be aware that there is no such thing as privacy on the Internet. Internet E-mail is not a secure method of delivering sensitive information since it may be monitored by any Internet system operator along the delivery route.

Internet access will be authorized to employees who have a need for this business tool at the discretion of their respective department head. The employee who has access to the Internet should be aware that a transaction log (similar to a telephone log) is kept of all Internet sites visited by each employee. These logs may be reviewed to identify inappropriate use of the Internet. Specific Web sites may be automatically prohibited by the City of Keene network security system.

A. General Computer Use

1. Accessing the files of others without permission is prohibited.
2. Logging into the network with a login name belonging to another is prohibited.
3. Users are expected to log on to their own City of Keene network account before they begin to use network, e-mail, and/or Internet resources.
4. For security purposes employees will not reveal their password or any information about the City of Keene network infrastructure.
5. Use of the computer network, e-mail, and Internet for commercial purposes or in support of illegal activities is prohibited. Employees will not use any network, e-mail, or Internet resources to conduct commercial business not related to the City of Keene.
6. Use of City computers for the display or transmission of sexually explicit images or messages, racial or ethnic slurs, or anything that may be construed as harassment of others based on their race, national origin, sex, sexual orientation, age, disability, religion or political beliefs is strictly prohibited.
7. Employees shall complete a training session conducted by IMS before they are authorized to use the network, e-mail, and Internet.

B. Use of E-mail

1. Employees are advised not to reveal any confidential information in their e-mail.
2. Any information transmitted is a public record and is subject to the same scrutiny as a traditional written letter.
3. E-mail is provided for City business. Personal communications, although not strictly prohibited, must be kept at a minimum to maximize employee productivity.

C. Use of the Internet

1. The employee will restrict their use of the Internet to work-related subjects.
2. Resources accessible via the Internet remain the property of the individuals and organizations who own the rights to those resources and they may not be copied without permission of the owner.
3. Employees will not download and/or install any software, to include software drivers, from the Internet without the prior written permission of the IMS Department. This is to protect the integrity of the individual PC's and to protect the City of Keene network from viruses that could be destructive to the electronic information stored on the City of Keene network disk drives.

D. Internet Software

1. Internet software will be provided by IMS only on PC's authorized by department heads.
2. Only the IMS Department is authorized to install Internet software on City of Keene PC's.

(Continued on next page.)

Employee Acceptance of this Policy

I acknowledge that I have read the City of Keene Network Use Policy and agree to the terms therein. I understand that my activity on the City computer network, e-mail system and Internet may be monitored, and that my access to the network, e-mail and Internet may be revoked at the discretion of my department head, the IMS Director, and/or the City Manager and that further disciplinary action may result.

_____ ___ _____

Employee Full First Name *M.I.* *Last Name*
(no nick names please)

_____ _____

Employee Signature *Date*

To be completed and signed by Department Head and Finance Director:

Department Name: _____

Employment Start Date: _____

Access to the FIS system: ☐ Yes ☐ No

FIS Purchasing System? ☐ Yes ☐ No
FIS Payroll System? ☐ Yes ☐ No
FIS Accounting System? ☐ Yes ☐ No
Authorized Cost Centers: _____ _____ _____ _____

_____ _____

Finance Director's signature *date*
(required for FIS Access)

List City e-mail distribution lists this user should be made a member of:

_____ _____

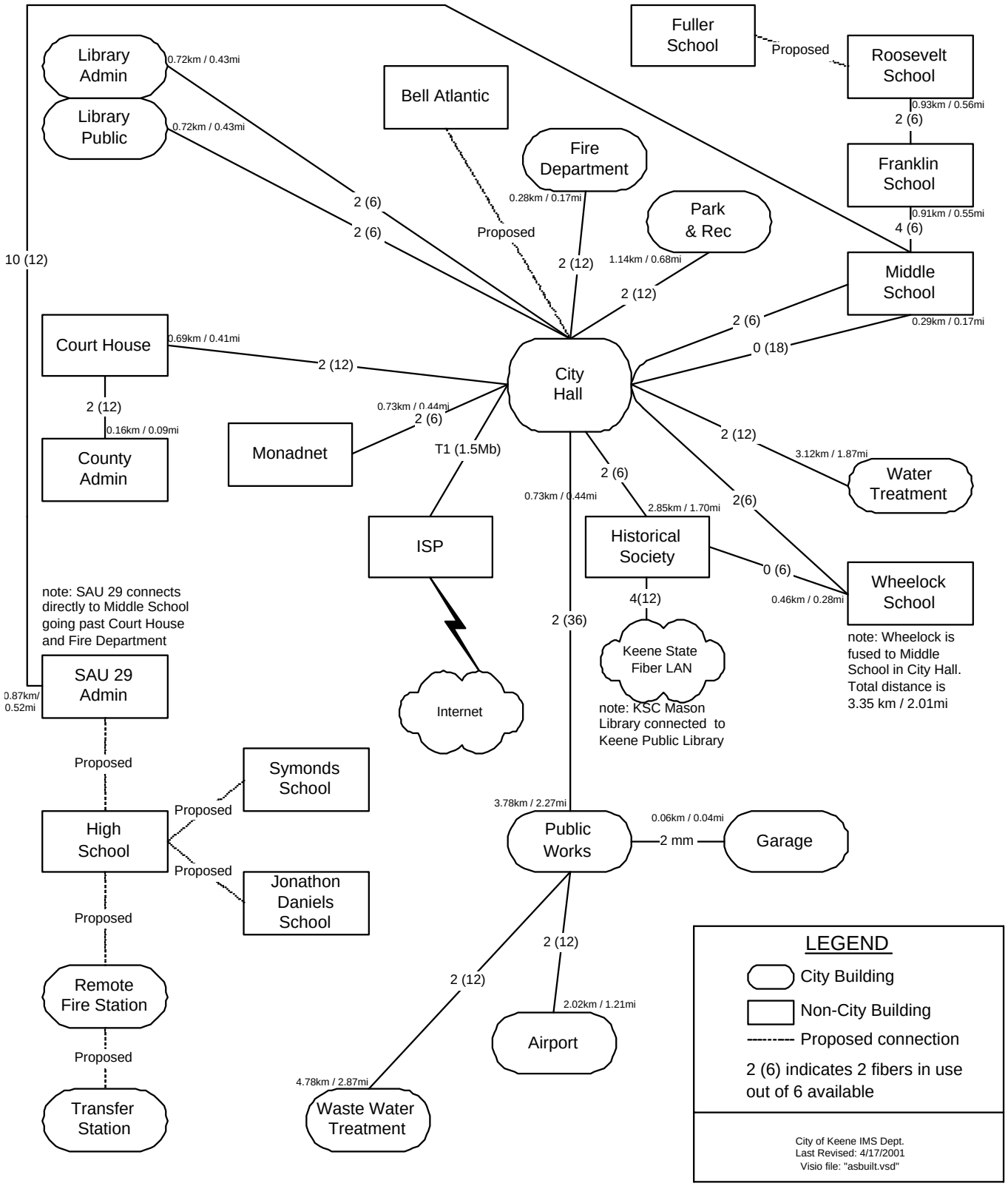
_____ _____

_____ _____

_____ _____

Department Head Signature *date*

Appendix B: Network Diagram
City of Keene Fiber Optic Network



Appendix C: City Network Growth Patterns

City IT Environment Variables:	1996	2001	Percent Increase
End Users	107	295	275%
Full-Time IMS Staff	4	6	150%
Ratio of End Users to IMS Staff	25:1	50:1	200%
Servers	4	14	350%
PC's (includes laptops)	135	225	167%
Client/Server Information Systems	3	15	500%

1996 Information Systems:

1. VAX for Finance, Assessing, Clerks, Police, Code Enforcement, Youth Services, Fleet, Parking, Reporting, and City Email and Calendar.
2. SMS for Transfer Station
3. Keene-Link for Library

2001 Information Systems:

1. Pentamation for Finance
2. IAS for Assessing
3. CityView for Clerks, Youth Services, Parks and Recreation
4. CFAWin for Fleet
5. IMC for Police and Fire
6. Packet Cluster for Police
7. TickeTrak for Parking
8. SCADA for Water and Waste Water
9. MP2 for Utilities Maintenance at Waste Water
10. SMS for Transfer Station
11. Keene-Link (to be Millennium) for Library
12. Code Enforcement application on Intranet
13. TrackIt for IMS
14. Microsoft Exchange for City Email and Calendar
15. Cognos Impromptu Client/Server Data Analysis Tool For All Departments

New Information Systems on the Horizon:

1. City Code
2. DPW Information Management System
3. GIS
4. Data Integration Solution
5. NHMAPS for Human Services

Appendix D: Priority IT Project Plan Matrix

Project	Type	CIP?	Supported Priorities	Departments Affected	Implementation Cost	Timeline (May 2001 Base point)
Data and Internet Integration	A	Yes	C	All	$250,000	2 years
GIS	A	Yes	C	All	$173,500	3 years
DPW Information Management System	A	Yes	C	Public Works	$81,614	1 year
Application Serving	T	Yes	C	All	$125,000	1 year
Library Keene-Link Software Conversion	A	Yes	C	Library	$35,255	1 year
Network Connectivity	T	Yes	I	Fire	$111,154	1 year
Phone System Upgrades	T	Yes	S,I	Police, Fire *	$229,500	3 years
Tax Billing	A	Yes	C	Finance, Assessing	$48,730	1 year
Network Data Storage	T	Will Be	C,I	All	$100,000 *(Est.)*	2 years
Network Equipment Upgrades	T	Will Be	I	All	$80,000 *(Est.)*	2 years
Technical Liaison Program	M	No		All	$0	Ongoing
Outsourcing Technical Services	M	No		IMS	$51,200 *(FY02)*	Ongoing

** The Phone system upgrade will eventually benefit all departments after Police and Fire have been upgraded and the NSS system is installed to improve phone services to all departments.*

Types

M = Management Project. These projects are focused toward streamlining IMS Department operations.

A = Applications Project. These are new large-scale information system implementations.

T = Technology Project. These projects typically support the ongoing maintenance, support, and installation of IT infrastructure and information systems.

Supported Priorities

All of these projects are possible because of the current existence of standards, centralization, and infrastructure. This column depicts which of these priorities is enhanced by each project.

S = Standards. These projects support the implementation and maintenance of City IT standards.

C = Centralization. These projects support the City's centralization efforts.

I = Infrastructure. These projects support the ongoing support and maintenance of the City's IT infrastructure.